

*File*

# INTER-COMPANY CORRESPONDENCE

Post Office Box P  
OAK RIDGE, TENN.

(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS CORP. LOCATION \_\_\_\_\_

TO: Mr. W. C. Moore  
LOCATION: Technical Service Section  
Building K-1401  
ATTENTION:  
COPY TO: Mr. C. L. Stewart  
Mr. F. E. Smothers  
File ✓

DATE March 29, 1946

ANSWERING LETTER DATE

SUBJECT Mercury Stills

A report from the Industrial Hygiene Department of the Laboratory Division shows that the mercury vapor concentration in the vicinity of the mercury stills in the furnace room of Building K-1401 was consistently higher than the maximum toxic limit for prolonged exposure. The Laboratory survey was made during the period from January 29 to February 7, 1946.

Mr. F. E. Smothers and the undersigned conferred with Mr. H. L. Brown of your department on March 22 on the subject of precautions to be taken when operation of these stills is resumed.

- 1) It was agreed that the exhausts from the vacuum pumps on the stills should be manifolded and piped to the outside of the building.
- 2) It was also agreed that a rigorous program of housekeeping with regard to mercury should be instituted. Spills should be cleaned up immediately and thoroughly. An industrial type vacuum cleaner is recommended.
- 3) In view of the fact that the equipment has been modified since the Laboratory survey was made, it is thought that suggestions number 1 and 2 outlined above represent only preliminary steps, and the final recommendations will be made only after a re-survey of the Hg concentration has been made in the vicinity of the stills in their new locations.

This document has been approved for release to the public by:

*Arvin S. Smith* 4/8/46  
Technical Information Officer Date  
Oak Ridge K-25 Site

*J. H. Bull*  
J. H. Bull  
Technical Engineer

Reviewed by:

*Claude L. Stewart*  
Claude L. Stewart  
Chief Safety Engineer  
Safety Department

JHB:hjs

Oak Ridge K-25 Site  
Oak Ridge, Tennessee 37831-7314  
managed by  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the U.S. DEPARTMENT OF ENERGY  
under Contract DE-AC05-84OR21400

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**CARBIDE AND CARBON CHEMICALS CORPORATION**  
UNIT OF UNION CARBIDE AND CARBON CORPORATION

UCC

POST OFFICE BOX P  
OAK RIDGE, TENN.

February 11, 1947

United States Atomic Energy Commission  
Post Office Box E  
Oak Ridge, Tennessee

ATTENTION: Lt. Col. R. W. Cook  
K-25 Division Chief

SUBJECT: Atmospheric Analyses for  
Trichloroethylene Vapor

Gentlemen:

We are transmitting herewith a report by the Industrial Hygiene Section of the Works Laboratory, Survey Report # TCE-5 entitled, Report of Survey to Determine the Concentration of Trichloroethylene in the Atmosphere in the Vicinity of the Degreasing Tank in Building K-1401 by Means of a Pyrolysis Method with Chemical Analyses.

This report is being furnished in reply to your letter of August 8, 1946.

Very truly yours,

This document has been approved for release  
to the public by:

*Kevin Bristol*  
Technical Information Officer  
Oak Ridge K-25 Site

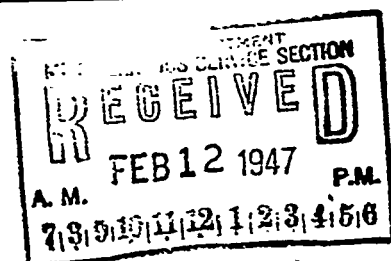
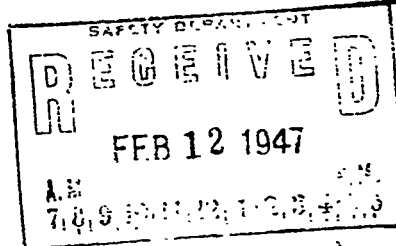
4/18/95  
Date

*William L. ...*  
Plant Superintendent

G. E. Conner  
JHG:mms (encl.)

CC: Mr. T. E. Lane  
Mr. L. G. Bower ✓  
File

Oak Ridge K-25 Site  
Oak Ridge, Tennessee 37831-7304  
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Works Laboratory  
Industrial Hygiene Section  
Survey Report # TOL-5

Section Report  
HA - 697

Report of Survey to Determine the Concentration of  
Trichloroethylene in the Atmosphere in the Vicinity  
of the Degreasing Tank in Building K-1401 by Means  
of a Pyrolysis Method with Chemical Analyses

A total of seventy-eight air samples were taken in the vicinity of the degreasing tank in the K-1401 Building during the period of January 17, 1947 to January 28, 1947, inclusive, and analyzed for trichloroethylene by a pyrolysis method with chemical determination. In addition, seventy-eight analyses were made simultaneously using an Imperial Halide Leak Detector for comparative purposes, to assist in evaluating data previously obtained by that method.

All air was sampled at face level in positions to represent the atmosphere breathed by operators working at or near the degreasing tank during normal operating conditions.

The chemical determinations gave the following results:

<u>Sampling Position</u>	<u>Number of Determinations</u>	<u>Average Trichloroethylene Concentration</u>
At face level immediately adjacent to the tank	64	240 ppm *
At face level approximately 10 ft. away from the tank	9	44 ppm *
At face level approximately 15 ft. away from the tank	1	40 ppm *
At face level approximately 20 ft. away from the tank	4	24 ppm *

- \* The results reported for the chemical determinations were calculated assuming 100% conversion of the chloride in the trichloroethylene to titrateable HCl. The method is essentially that of A. W. Setterlind, State of Illinois Division of Industrial Hygiene Laboratory Manual, March 1942, modified slightly to meet our needs. Our brief laboratory investigation indicated that only approximately 70% of the chloride was converted. Some literature references describe

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Page 2 - continued

methods giving conversions approaching 100%, but it appears likely that a large portion of the data in the literature on the physiological effects of trichloroethylene was obtained by methods actually giving considerably less than 100% conversion to titrateable HCL.

The results obtained with Imperial Halide Leak Detector, using our standard reporting terminology of "constant", "frequent", and "occasional" to indicate the frequency of the observed concentration gave good correlation with the chemical determination. The "constant" readings, with one exception appeared to be very reliable. "Frequent" readings appeared to require a weighting of approximately 50%, whereas "occasional" readings, as expected, are indicative but not truly significant.

The data obtained by both methods is attached. The sampling positions identified on the attached drawing are our standard sampling positions for the degreasing tank. Sampling position # 4 was omitted for the purposes of this survey.

February 5, 1

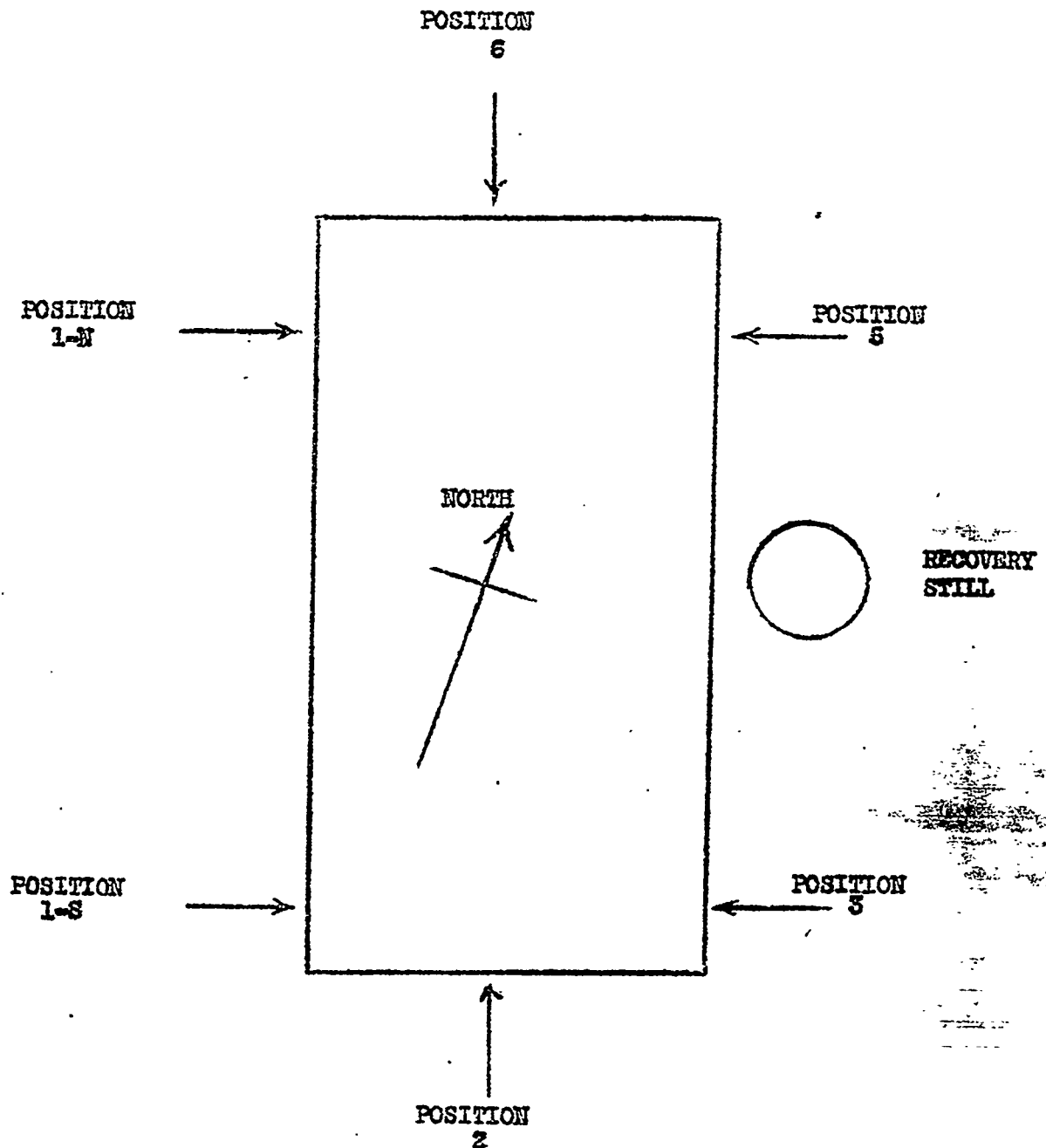
N. H. Ketcham  
Section Supervisor

R. H. Rainey  
Supervisor Field Investigation Group

HHK:as:msm

COPY

Diagram of Sampling Positions Adjacent  
to the Degassing Tank in the K-2401 Building



DATE	POSITION # 1 N		POSITION # 1 S		POSITION # 2		POSITION # 3	
	CHEMICAL DETERMINATION	IMPERIAL HALIDE LEAK DETECTOR READING	CHEMICAL DETERMINATION	IMPERIAL HALIDE LEAK DETECTOR READING	CHEMICAL DETERMINATION	IMPERIAL HALIDE LEAK DETECTOR READING	CHEMICAL DETERMINATION	IMPERIAL HALIDE LEAK DETECTOR READING
1947	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Jan. 17					330 260 390 320	Freq. 900-1000 Freq. 900-1000 Freq. 900-1000 Freq. 900-1000	20 36	Occ. Occ.
Jan. 20	25	Const. <75	50	Const. <75	120 110	Occ. 300-500 Occ. 300-500		
Jan. 21	580 560	Freq. 1000 Freq. 1000	490	Const. 300-500	300	Freq. 500-500	75	Occ.
Jan. 22	300	Occ. 300-500	400	Occ. 300-500	340	Const. 300-500	50	Occ.
Jan. 23	240 330	Freq. 300-500 Freq. 300-500	600 460	Occ. 900-1000 Occ. 600-800	180 80	Freq. 100-200 Const. 75	50 100	Const. Occ.
Jan. 24	700 390	Freq. 900-1000 Freq. 600-800	510 265	Freq. 300-500 Freq. 300-500	660 115	Freq. 300-500 Freq. 300-500	100 100	Occ. Occ.
Jan. 27	450 280	Freq. 600-800 Occ. 600-800	450 160	Freq. 300-500 Const. 100-200	150 180	Occ. 300-500 Occ. 300-500	50 50	Const. Occ.
Jan. 28	140	Freq. 300-500	210 440	Occ. 300-500 Freq. 600-800	250	Occ. 600-800	50	Occ.
	Ave. 360		Ave. 350		Ave. 270		Ave. 70	

POSITION # 5		POSITION # 6		MISCELLANEOUS POSITIONS		
IMPERIAL HALIDE LEAK DETECTOR READING	CHEMICAL DETERMINATION	IMPERIAL HALIDE LEAK DETECTOR READING	CHEMICAL DETERMINATION		IMPERIAL HALIDE LEAK DETECTOR READING	CHEMICAL DETERMINATION
PPM	PPM	PPM	PPM	POSITION	PPM	PPM
00-200				10 ft. behind #2	50	Occ. 300-500
00-200				10 ft. behind #2	90	Freq. 300-500
				20 ft. behind #2	20	Const. <75
				20 ft. behind #2	7	Occ. 100-200
	260	Freq. 300-500	170	Occ. 600-800	20	Const. <75
				10 ft. behind #5	30	Const. <75
				10 ft. behind #6	20	Const. <75
				20 ft. behind #6		
00-200	190	Occ. 300-500	90	Occ. 300-500	110	Occ. 100-200
				10 ft. behind #2	30	Const. <75
				10 ft. behind #1N	50	Const. <75
				20 ft. behind #2		
00-500	260	Freq. 300-500	250	Freq. 300-500		
<75	175	Freq. 300-500	90	Occ. 300-500		
00-200	250	Occ. 300-500				
00-500	130	Occ. 300-500		15 ft. behind #2	40	Const. <75
00-500						
75	180	Const. 100-200	100	Freq. 300-500		
00-200	160	Const. 100-200	160	Const. 100-200		
75	170	Freq. 300-500	220	Occ. 300-500	30	Const. <75
				10 ft. behind #6	20	Const. <75
				10 ft. behind #5	20	Const. <75
				10 ft. behind #2		
	Ave.		Ave.			
	220		150			

# INTER-COMPANY CORRESPONDENCE

(DISSECT NAME) COMPANY CARBIDE AND CARBON CHEMICALS CORP. LOCATION Post Office Box P OAK RIDGE, TENN.

LOCATION

**Mr. B. Speyers  
K-1401 Building**

DATE **March 25, 1947**

ATTENTION

COPY TO

**Mr. G. Jamison  
Mr. L. G. Bamer  
Mr. J. C. Worthington  
File**

ANSWERING LETTER DATE

SUBJECT **Trichloroethylene Degreaser  
In Vacuum Pump Shop, K-1401**

Recent industrial hygiene analyses have shown excessive trichloroethylene vapor concentrations in the vicinity of the degreaser in the Vacuum Pump Shop. On the basis of these analyses and an inspection made by the undersigned on March 20, 1947, the Safety Department makes the following recommendations with regard to this degreaser.

- 1- The degreaser should be modified so that the linear velocity of air through the working opening in the front of the degreaser is maintained during degreasing operations at not less than 400 feet per minute. The area of the opening is approximately 8 square feet and thus a total flow of 3200 cubic feet per minute would be required. The exhaust blower now in use should be able to exhaust this volume if an adequate duct is installed.
- 2- Means should be provided for assuring that the temperature of trichloroethylene in the degreaser well does not reach the boiling point. Such a device is now installed but was apparently not functioning on at least one occasion when the trichloroethylene was observed boiling vigorously. This degreaser does not have sufficient condenser capacity to be operated as a vapor phase degreaser.
- 3- Windows and doors in the vicinity of the degreaser should be kept closed since any disturbance of the air by wind blowing through such opening will seriously decrease the efficiency of trichloroethylene fume removal.
- 4- Persons operating this degreaser should wear face shields. A sign is now posted on the degreaser giving instructions to this effect but operators have been observed to ignore these regulations. The splashing of hot trichloroethylene presents a serious eye hazard. Extremely painful injuries can result although no permanent damage is usually expected.
- 5- It is suggested that the use of perchloroethylene be considered for this degreaser. Perchloroethylene has a considerably lower vapor

This document has been approved for release to the public by:

*John D. Fultz* 4/18/45  
Technical Information Officer  
Oak Ridge K-25 Site

Date

Oak Ridge K-25 Site  
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pressure than trichlorethylene at corresponding temperatures and thus a smaller amount of toxic vapor would be released. For equal concentrations of vapor in air the toxicity of these materials is approximately the same. Only a trial will indicate whether the solvent properties of perchlorethylene will be suitable for this use.

*JH Bull*  
\_\_\_\_\_  
J. H. Bull  
Technical Engineer  
Safety Department

Original Signed By  
CLAUDE L. STEWART

Reviewed by:

\_\_\_\_\_  
C. L. Stewart  
Asst. Supervisor  
Safety Department

JHB:smm

Central Super

# INTER-COMPANY CORRESPONDENCE

(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS CORP. LOCATION \_\_\_\_\_

Post Office Box P  
OAK RIDGE, TENN.

TO: Mr. G. A. Jamieson  
LOCATION K-1401

DATE July 6, 1949

ANSWERING LETTER DATE

ATTENTION  
COPY TO J. S. Lyon, M. D.  
Mr. A. F. Becher  
File

SUBJECT Industrial Hygiene Air  
Sampling.

Dear Mr. Jamieson:

Recent highly positive atmospheric mercury determinations made on the inside of the shoes worn by the personnel in the Vacuum Pump Shop are, to some extent, coincident with urinary evidence of mercury absorption. There is no clinical evidence of damage sustained from exposure to mercury by any of the persons concerned, even though the urinary mercury findings have been in the range of the maximum acceptable rate of excretion, above which one might expect to find some damage.

It is the opinion of the Medical Department that all "Contaminated" shoes should be replaced and a study of the problem initiated. The maximum acceptable level of contamination is yet to be established; however, on the basis of available data, the following initial working standard is suggested: When a shoe has an inside atmospheric mercury contamination equal to or exceeding 0.08 mg Hg per cubic meter, it is to be considered "Contaminated" and ready for exchange.

Since an increase in the number of mercury contaminated parts to be processed in the Vacuum Pump Shop is expected in the near future, it is suggested that all the personnel be examined monthly for urinary mercury. These persons are to be checked as nearly as possible during the same period in which their shoes are examined for atmospheric contamination.

It is hoped that these tests, over a period of several months, will lead to a proper evaluation of the situation so that suggestions of a more permanent nature may be made.

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under Contract DE-AC05-84OR21400

Yours very truly,

*D. L. Stoddard*

D. L. Stoddard  
Industrial Hygienist

DLS/mw

Approved by:

*J. S. Lyon*  
J. S. Lyon, M. D.  
Asst. Medical Director

This document has been approved for release  
to the public by:

Technical Information Office

Date

Oak Ridge K-25 Site

THIS FORM FOR INTER-COMPANY CORRESPONDENCE ONLY